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An analysis of urinary prostate specific antigen before and after radical prostatectomy: evidence for secretion of prostate specific antigen by the periurethral glands.

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We investigated whether urinary prostate specific antigen (PSA) might be a useful marker to detect locally recurrent tumor after radical prostatectomy. We also investigated whether PSA in the first 1 to 5 cc of voided urine is a more useful indicator of urinary PSA levels than the midstream urine PSA, since the first portion of the voided urine contains the highest concentration of prostatic and urethral secretions. To determine the response of urinary PSA to radical prostatectomy, we obtained first voided and midstream urine PSA levels in 18 patients with adenocarcinoma of the prostate before and after surgery. Mean first voided urine PSA levels decreased from 915.1 ng/ml. (range 21 to 2,853) preoperatively to 21.4 ng/ml. (range 0.9 to 88) postoperatively, while mean midstream urine PSA levels decreased from 245.9 ng/ml. (range 5 to 1,312) preoperatively to 1.8 ng/ml. (range 0 to 20.4) postoperatively. We also obtained postoperative first voided and midstream urine PSA levels in 9 prostate cancer patients who had undergone radical prostatectomy, and were considered to be cured by rigid clinical and histological criteria. To distinguish bladder versus urethral sources of urinary PSA in patients without a prostate, we additionally studied 11 patients without prostate cancer who had undergone cystoprostatectomy with orthotopic bladder substitution and who had undetectable serum PSA levels by the ultrasensitive assay. In the cured prostatectomy patients the mean first voided urine PSA level was 40.2 ng/ml. (range 2.8 to 100) and the mean midstream urine PSA level was 3.4 ng/ml. (range 0.1 to 15.2), while in the cystoprostatectomy patients these levels were 15.5 ng/ml. (range 0.8 to 49.9) and 1.2 ng/ml. (range 0 to 6.4), respectively. We conclude that the first voided urine sample better reflects local PSA production by the prostate than the midstream sample, first voided urine PSA decreases significantly in response to radical prostatectomy but is still present in measurable amounts even in surgically cured prostate cancer patients and urethral secretion of low levels of PSA persists after radical prostatectomy. This finding diminishes the chance that the first voided urine PSA level will be a useful marker to detect locally recurrent tumor after radical prostatectomy. Further studies are needed to determine if there is a critical level of first voided urine PSA after radical prostatectomy above which there is an increased likelihood of locally recurrent tumor but overall urinary PSA is highly unlikely to be clinically useful.

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